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Mixed Fibre Nonwoven or Woven Fabric

The invention concerns a mixed fibre nonwoven or woven fabric for making nonwoven or woven articles such as fillings for bedding, upholstered furniture and automotive interiors or the associated covers, textile garments and linings.

A mixed fibre bonded fabric made from sheep's wool and kapok fibres is known, DE 40 30 172 C2, which as a wholly natural product takes into account above all the hygienic requirements not least of hospitals, laboratory facilities and nursing homes, as the kapok fibre content gives such a mixed fibre fabric an antibacterial and antiseptic property.

The object of the invention is to provide a mixed fibre nonwoven or woven fabric that offers further optimised moisture management compared to the known mixed fibre fabric and which without the use of chemicals has an antibacterial action, ensures freedom from house dust mites and is 100% biodegradable.

According to the invention, the solution to this lies in the elements of the characterizing portion of the main claim In conjunction with the elements of the preamble to the main claim.

The mixed fibre nonwoven or the mixed fibre woven fabric consists of the principal components cellulose fibres and kapok fibres such that the kapok fibre content ensures that an object made from such a mixed fibre nonwoven or mixed fibre woven fabric remains permanently free from house dust mites and bacteria without laborious cleaning or washing operations. As both components consist of renewable vegetable raw materials, a pure, easily biodegradable and easily decaying natural product is provided which, moreover, functions in a particularly advantageous way as a climate fabric. According to the temperature difference between a heat source such as the body heat of a sleeper under the fabric and an external temperature rising from cold to warm above the fabric, when the material according to the invention is used a shift in its effect takes place from 'initially warming' to 'dissipating more heat' to 'thermal insulation effect'.

Further advantageous embodiments of the subject of the invention are evident with and in combination from the subordinate claims below.

According to a particularly advantageous embodiment of the invention, the cellulose fibres used are cellulose fibres or cellulose regenerate fibres made industrially by a chemical process such as viscose, modal or similar, as they can show properties some of which are perceptibly superior to those of natural cellulose fibres.

In a particularly advantageous embodiment of the subject of the invention, the cellulose fibres consist of lyocell fibres manufactured by the solvent process,

which demonstrably provide optimised moisture management compared to sheep's wool, in particular which ensure better moisture absorption and a better moisture balance, as well as being more breathable. A further advantage of lyocell fibres is their high wet strength, which is approximately 20% higher than that of viscose and, in addition, the great fineness with which lyocell fibres can be manufactured.

As such lyocell fibres can be processed into nonwovens and also into woven fabrics, a starting product for further processing is provided in conjunction with the kapok fibres, which has clear technical advantages over known mixed fibre nonwovens or woven fabrics and which due to the kapok fibre content remains antibacterial and free from house dust mites, even without cleaning or washing, and which moreover is 100% biodegradable.

Due to the use of the lyocell fibres in a mixed fibre nonwoven or woven fabric, besides the technical advantages there are also other advantages, such as physiological advantages, for instance if such a fabric is used for bedding. These include an "instant heat effect" and hence a subjective feeling of wellbeing induced by a new kind of resonant heat reflection. The new mixed fibre fabric therefore represents a new kind of climate fabric. This is achieved because the strongly hydrophilic behaviour of lyocell plus the air volume due to bulk mixed with kapok and the latter's good insulation property in conjunction with a user's body heat as a heat source cause this physical reaction of a resonant heat reflection. The fabric immediately returns the radiated heat back to the heat source in a resonance reaction. The perceptible effect is subjectively even higher with moist heat.

Due to the blend of hydrophilic lyocell content and the hydrophobic kapok content a unique climate effect occurs in the presence of a heat source, such as a sleeper's body heat, and this leads to movement of air layers (wind) in the fabric. Due to the high relative water vapour conveying power of lyocell, warm moist body vapours are for example rapidly conveyed towards the cooler bedroom which has a lower atmospheric humidity. This effect is considerably accelerated by the hydrophobic kapok content. This rapid drying of the lyocell components supports the properties provided by the kapok, which keep the material free from bacteria and mites, making it especially suitable for people allergic to house dust mites because it removes the moisture which bacterial cultures and house dust mites need in order to grow.

Even if a sleeper is giving off increased sweat, however, the moisture can be absorbed and stored for a short time, with locally occurring moisture being distributed over larger areas of the fabric in a quasi blotting paper function.

All in all, in proportion of the body temperature of a sleeper in a cool room to that in a warm room, the functioning of the mixed fibre fabric shifts from initially providing instant heat to dissipating surplus heat to insulation against excess external heat and this has a subjectively cooling effect.

The individual components processed to make monogamous nonwoven fabrics do not provide any other functions than the known ones, whereas the homogenous blend of the two natural materials, on the other hand, provides functions which in terms of insulation, hygroscopicity and consumer benefits develop a very special effect as a climate fabric and are simple, ingenious and natural.

As the lyocell fibres and also in particular the kapok fibres do not have very great bulk, it is possible according to a further embodiment of the invention additionally to add polyester fibres to the mixed fibre fabric made from cellulose fibres, in particular lyocell fibres and kapok fibres, in order permanently to improve the bulk.